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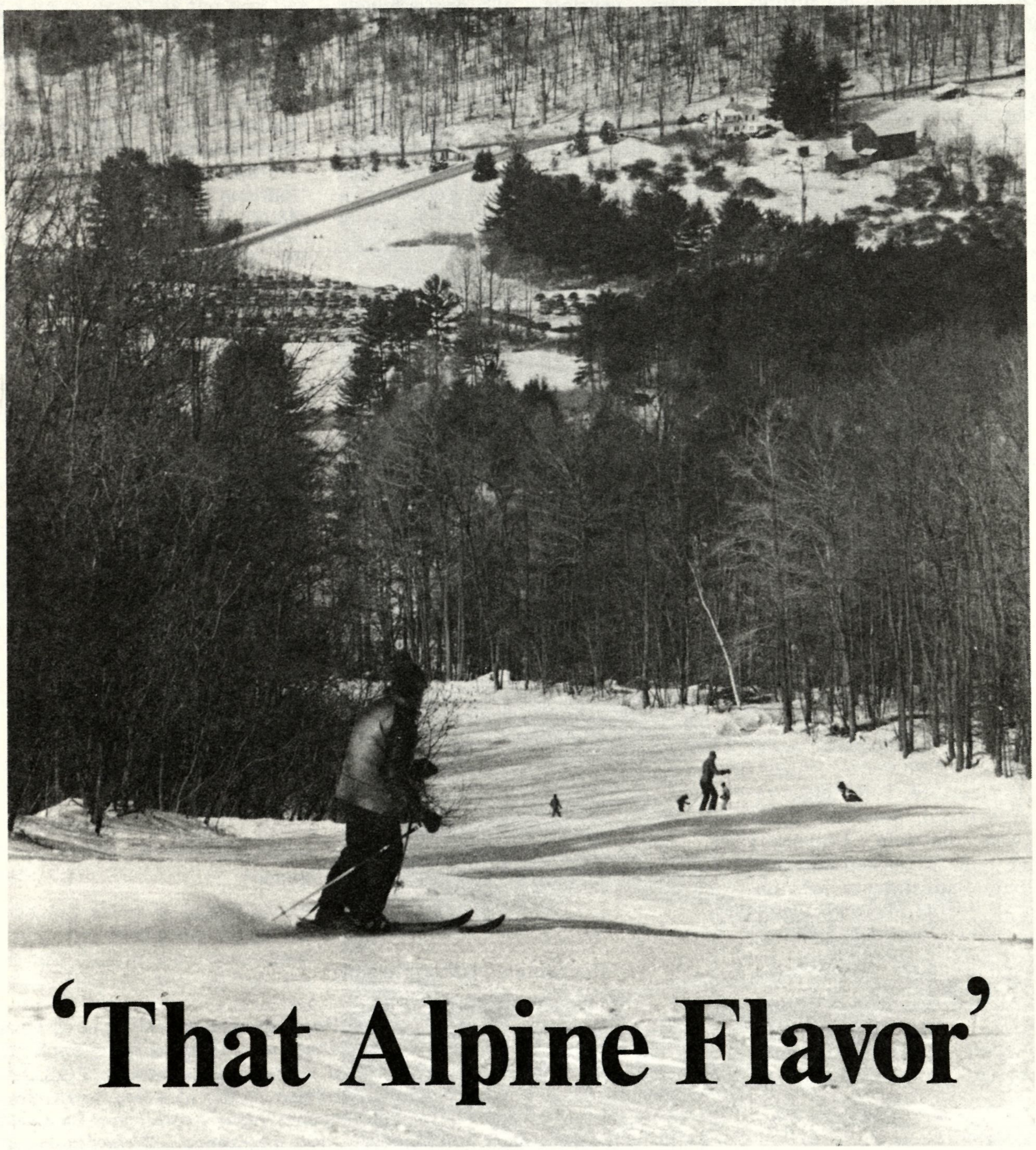

# 'That Alpine Flavor'

**Inside** *Environmental Reviews, 2; Mohawk's Slopes, 3; Suiting Feeders to Birds, 5; AIMing for Clean Air, 6; Deer: Changing Herds & Regulations, 8; Hot Water, 10; How Glaciers Shaped State's Landscape, 12; FYI: Hazardous Waste Conferences, 14; CAM: Year of the Coast, 15; Septic Additives, 15; 208: Hazardous Waste Update, 16; 1979 Reviewed, 17; Trailside Botanizing, 20.*

# Environmental Review Teams Keeping Busy

*By Richard Hyde, Principal Environmental Analyst, Natural Resources Center*

Both Environmental Review Teams continued at high levels of effort during the fiscal year 1979. Awareness of the availability of this unique service increased, and a total of 57 individual sites in Connecticut, covering 11,062 acres of land in 44 towns, were evaluated. Ten towns had repeat requests. The types and numbers of projects that were conducted during this period are shown in the table below.

The purpose of an Environmental Review Team (ERT) is to provide town decision makers and developers with natural resource data and interpretation which will improve environmental quality and the long-term economics of land use. A unique aspect in the evolution of the ERT has been the cooperation among different agencies at various levels of government. The ERTs were initially brought together under the umbrella framework of the Eastern Connecticut Resource Conservation and Development (RC&D) Area and subsequently under the Kings Mark RC&D Area. Participating agencies provide staff time to the RC&D Committees which developed the team concept and procedures and when able provide the technical staff for the actual reviews.

Principal participating agencies are the United States Department of Agriculture, Soil Conservation Service (SCS), Soil and Water Conservation Districts, University of Connecticut Extension Service, Connecticut Departments of Environmental Protection and Health Services, and ten regional planning agencies. Direct funding for the teams originates through the DEP's budget with the two RC&D organizations being subcontracted to provide the ERT administration, coordination, and ancillary support.

Prior to the beginning of state funding of the Environmental Review Teams in fiscal 1977, DEP received a special one-year Innovative Projects Grant from the U.S. Department of Housing and Urban Development. The following year HUD contracted with the American Institute of Planners (AIP) and the International City Management Association (ICMA) to study over four hundred HUD-funded projects carried out between 1771 and 1976. Connecticut's Environmental Review Teams were identified as one of the top two projects for their considerable success within the state as well as for the concept's transferability to other states.

Each Environmental Review Team consists of professionals covering a wide range of disciplines within the fields of natural resources, engineering, and planning. Except for the team coordinator, hydrogeologist, and forester/ecologist, all members are temporarily assigned to the team from other cooperating agencies. Following a

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## Environmental Reviews, Fiscal 1979

| Type | Number |
|---|---|
| Housing subdivisions | 28 |
| Heritage Conservation and Recreation Service (purchase and development funding for open space properties; ERT provides assistance in developing impact statements)* | 10 |
| Commercial/industrial Developments | 8 |
| Natural resource inventories | 2 |
| Gravel excavation/land reclamation | 2 |
| Municipal facilities developments (town hall, town garage, etc.) | 2 |
| Indian tribal reservation property evaluation for purchase | 2 |
| Education/institutional development | 1 |
| Watershed studies | 1 |
| Recreation master planning | 1 |

*Projects in the category titled Heritage Conservation and Recreation Service represent ERT assistance to those communities filing applications to the State (through DEP) and Federal Government (through HCRS) for land and water conservation funds to purchase and/or develop town open space and recreation property. Team reports have been used successfully in projects totalling over $2,037,000 in cost assistance. These funds have been authorized and committed with $1,053,000 from the federal government and $492,000 each from the State of Connecticut and municipalities involved. Team input has also been completed on projects totalling $1,469,500 whose applications are still pending.

# MOHAWK

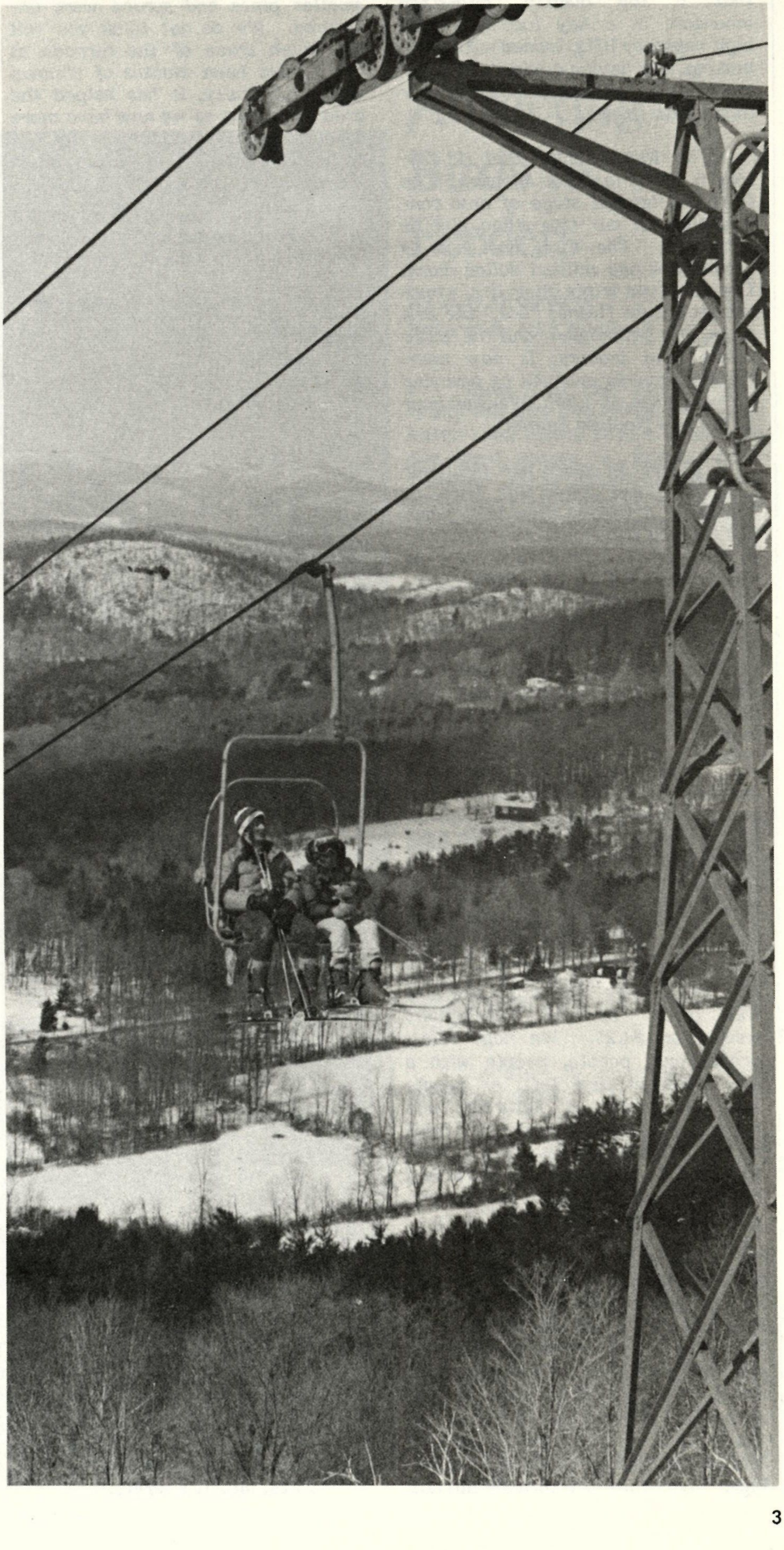
## Skiing with an Alpine Feeling, Closer to Home

"Don't they look like they're having a good time?" is the question Walter Schoenknecht, Mohawk Mountain's president and founder, asked over and over as he roamed the ski area last winter, on one of its busiest Saturdays, keeping an eye on the skiers and on all the things that might go into their enjoyment of their sport. From the locally baked sandwich rolls sold at the lodge's lunch counter to the snowflakes decorating its ceiling to the imposing and unusual evergreens (grown as one of Schoenknecht's hobbies) that dot many of Mohawk's slopes, he pays attention to details.

But not to the neglect of the big picture -- which includes a major five-year improvement program for the area, geared to a great extent to the effects energy problems are going to have on skiers' travels, plus a concern for skier safety and comfort and the general ambience of Mohawk Mountain. "We've tried to give Mohawk an Alpine flavor," says Schoenknecht, who has taken good advantage of the "great views" already there. The former owner and operator of Vermont's Mount Snow, Schoenknecht has also gone to some pains to make Mohawk's ski trails and base lodge picturesque and interesting.

Schoenknecht himself reports on developments at Mohawk since last year:

*The big thing is that Mohawk really is a fun mountain, large for what we are calling the Connecticut Berkshires, and it has all of the beauty and feeling of New England right here in Litchfield County. We think that it will truly come into its own this year as gasoline gets more expensive and harder to get. It is possible to reach us from greater New York City, Long Island, or northern Jersey, going back and forth on a tank of gas and having more than enough to go to work with on Monday. Mohawk is a mountain whose time has come.*



*I am more convinced than ever that a top quality, mid-sized mountain in a key location, with high capacity lifts, loaded with snow making, and having a wide variety of trails, will be badly needed in our immediate future.*

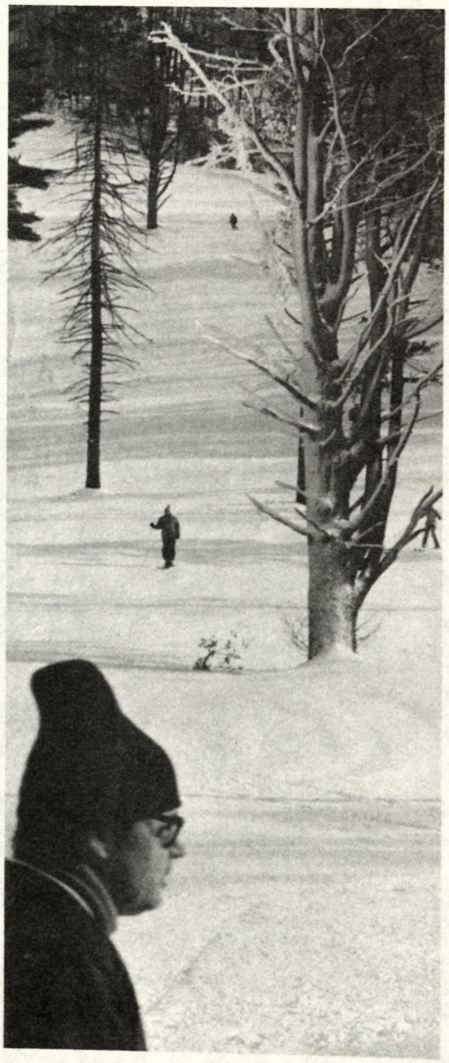
*We like to think that ski history is being made at Mohawk! The first and largest stage of new construction on our five-stage plan is complete. The total cost now is around the one million dollar mark. The new type triple chair lift, where the stop light flashes "GO," the bell rings, the gates open, and the three skiers load indoors, is now completely finished and will be carrying its full quota of 1,800 skiers an hour to the new Boulder Summit.*

*It was 30 years ago this year that artificial snow was born at Mohawk. Artificial snow in this age has become tremendously important; in fact, it is vital to a good ski operation. All of us will be celebrating the thirtieth anniversary of snow making officially this winter. We have good artificial snow now, but the next stage of construction will be to load the mountain with artificial snow on just about all trails.*

*A key part of our plan is to keep our weekday prices so low that our skiers will somehow manage to get a day off mid-week. We have gone up 50 cents on the weekends, to $12.50, and with high costs I doubt very much if I can hold this. The $8.50 weekday price has not been changed for 12 years, and the men's day Tuesday and the ladies' day Wednesday are still one-half that price in any non-holiday week -- or $4.25. We hope many professional people, people with a few vacation days left, or people who can work a Saturday and manage to take a nice day off mid-week will come skiing. In any case, the idea is beginning to work and hopefully will allow us to use the area fully seven days of the week.*

*This summer was complicated by the fact that we had both a heavy spring flood and a small fall tornado. Fortunately for us, the tornado was relatively small and hung about 60 feet off the ground. Its path, only about 100 feet wide, took it just across the base of our lift area. It would twist up giant pine trees and literally hurl them at our lift buildings. Thankfully the tornado did not touch ground and the large groves of smaller pines and spruce were unharmed. We do not think you will see much trace of the tornado as there have been months of cleanup work. Actually, it has helped the area somewhat as we now have more runout space, particularly in the novice area. The mountain itself was relatively untouched.*

For those not familiar with the area and its expansion, a few more facts may be in order:



- * Mohawk Mountain, in the Mohawk Mountain State Forest, is leased by the State to Schoenknecht for its operation as Connecticut's largest ski area, with an over 600 foot vertical drop spread over 500 acres.

- * It is the highest ski area in Connecticut, located on the third highest mountain in the State, Mount Everett.

- * Its 21 slopes and trails include the longest runs in the State, with several measuring one and one-half miles, and they offer skiing ranging from beginner to expert.

- * Mohawk is located in northwestern Conecticut, in the State's "snow belt," just off Route 4 in Cornwall, approximately an hour and one-quarter's drive from most southern Connecticut cities.

- * Mohawk was once considered the largest rope tow ski area in the world. Last year saw the first stages of a five-year development program designed to restore Mohawk to the capacity it originally had, as a 12-rope-tow area, of 3,500 skiers per day. Last year's improvements included the new triple chair lift, a new expert trail and a new intermediate slope, doubled snow making capacities (to a total of 32,000 feet of pipeline), a remodeled ski shop, and the addition of 300 pairs of skis to the area's rental inventory, for 850 units in total.

- * Besides the new triple chair lift, Mohawk has three double chair lifts, a Poma lift, and one rope tow.

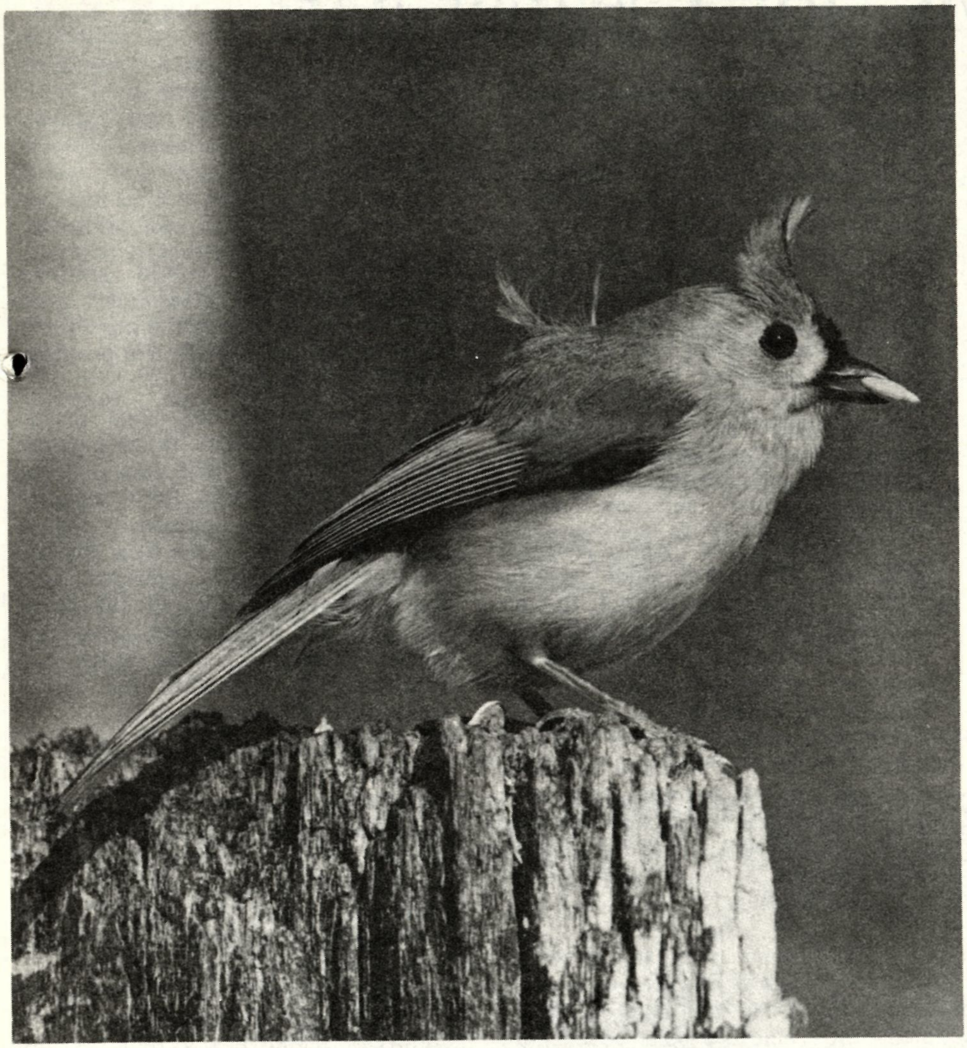
- * All lifts — and 65 percent of the terrain in all — are covered by snow making, which began at Mohawk. In January the Eastern Ski Writers Association will hold its annual meeting at Mohawk to commemorate the beginnings of artificial snow for skiing. (In 1949, the initial efforts involved a convoy of 27 trucks, all the block ice in Torrington, and a machine that chewed the 300 pound ice blocks into ice flakes.)

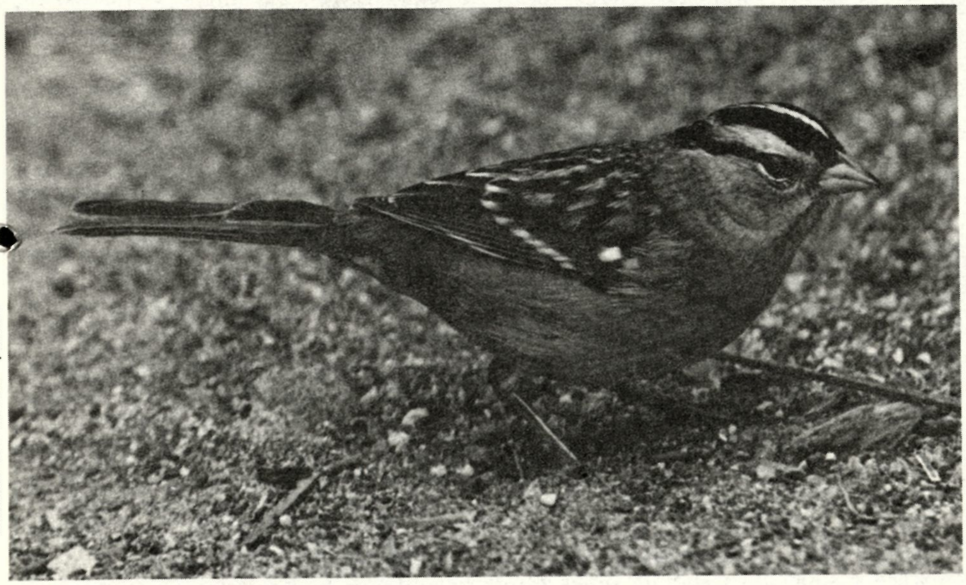
- * Besides half-price days, mid-week beginner ski packages offer lift/lesson/rentals for $11. There are junior rates for those 15 years old and under, carpool discounts, and group rates. Sometimes there's ice skating.

- * For information or brochures, call or write Mohawk Mountain, Cornwall, CT 06753 (203/672-6100). ■

# Attracting Birds to Feeders

*By Judy Silverberg,*
*Naturalist, DEP Region II*





Leonard Lee Rue III photos

Birds that use feeders generally fall into two categories: seed eaters and insect eaters. Some of the seed eaters — juncos, goldfinches, white-throated sparrows, white-crowned sparrows, and English sparrows — prefer to feed at ground level.

Other seed eaters — the evening grosbeak, chickadee, red poll, purple finch, white-breasted nuthatch, red-breasted nuthatch, cardinal, tree sparrow, tufted titmouse, crossbill, pine siskin, and bluejay — will eat off windowsill feeders, simple platforms, or at bleachbottle, tin can or other feeders that can be filled with seeds.

Insect eaters are attracted to suet, fat scraps, and peanut butter. These can be put into pinecones (fill the spaces between scales with suet and hang the cone), string bags (like those that hold onions), a log suet feeder (drill 3/4 inch holes into a log two to three inches in diameter and hang it from a low branch), or a suet feeder.

Location is important. Well-situated feeders:

- Are protected from strong winds
- Do not fill with rain or snow
- Are near shrubs and bushes for shelter and flight (But be careful not to place feeders where predators can easily hide and attack birds that may be on the ground under the feeder.)
- Are easy to fill and clean
- Offer you the greatest viewing pleasure ■

# Auto Inspection and Maintenance "AIMs" for Cleaner Air

*By Randy Sheinberg, Massachusetts Audubon Intern*

Riddle: What has four wheels, a tailpipe, and an ability to aggravate respiratory and heart ailments and produce nervous system problems? Answer: your car. Automobiles are the major cause of Connecticut's air pollution problems, contributing anywhere from 50 to 90 percent of the total hydrocarbons and carbon monoxide. Of course driving less and carpooling more are part of the solution. But what is also needed is a program to insure that cars on the roads pollute as little as possible. That program is Connecticut's new Auto Inspection/Maintenance (AIM) program.

The AIM program will begin in January 1981. Under the program, autos must be inspected each year for carbon monoxide and hydrocarbon emissions, and failure to meet the standards will mean either fines or non-renewal of registration. Starting with 1982, if a car fails to meet the required standards, it must be repaired within 30 days and reinspected in order to pass. Repairs cannot exceed $70 in cost, and will be the responsibility of the car's owner.

Connecticut's AIM program will be managed by the Department of Motor Vehicles. The Department of Environmental Protection sets the emissions standards and provides technical advice on the program's operation. The actual testing will be conducted by a private consultant. Bids are presently being accepted from different contractors for the job. It's expected that there will be approximately 23 testing stations with about 50 testing lanes across the State.

Other states have tried different methods of implementing their inspection/maintenance programs. In New Jersey and Oregon, for example, AIM is conducted by the state government. This sytem, though effective, can be quite costly. Private garages are given the responsibility for both inspecting cars and repairing them in Rhode Island. This method puts a great responsibility on the individual garages. Connecticut's method strikes a balance between cost and efficiency.

Connecticut's AIM program will use the idle mode testing method. In this type of test, the car is driven into the testing station and shifted into neutral. An exhaust gas analyzer probe is placed in the tailpipe while the engine is running. Using the non-dispersive infrared (NDIR) method, a machine measures the hydrocarbons in parts per million and the carbon monoxide emitted from the tailpipe. If these comply with the standards, the car receives a passing sticker.

With each test the motorist will receive information on the AIM program, the actual level of emissions the vehicle should be capable of attaining, and the most likely causes of problems. The expected failure rate is 20 percent.

The AIM program is just one facet of Connecticut's State Implementation Plan (SIP) for air quality. The Federal Clean Air Act of 1970 was amended in 1977. Before that time, the Environmental Protection Agency had set National Ambient Air Quality Standards (NAAQS) for five air pollutants, but Connecticut and many other states did not meet the standards or the 1975 deadline for achieving them. With the 1977 amendments, the EPA set new deadlines for attainment of the standards, and treatened those states that did not comply with economic sanctions. All states designated non-attainment for any of the pollutants were required to submit plans outlining how they would achieve attainment. The attainment goal deadline is 1982, with the possibility of an extension to 1987 if a problem is particularly bad.

Connecticut has been designated non-attainment for both ozone and particulates. The ozone problem is especially bad, for Connecticut exceeds the standards by a factor of two. Both the New Haven-Hartford-Springfield corridor and the southwestern area of the state are also non-attainment areas for carbon monoxide. The state has achieved the standards for sulfur dioxide and nitrogen dioxide.

When an automobile engine is not properly tuned it leaves a large portion of its gasoline unburned. Unburned gasoline is hydrocarbons, which leave the car in a gaseous state to pollute the air. In the presence of sunlight, hydrocarbons combine with nitrogen oxides to form photochemical oxidants, a group of compounds usually referred to as ozone. Connecticut's worst pollutant, ozone is a severe irritant which acts upon mucous membranes and does damage to the respiratory system.

To decrease hydrocarbon emissions, and thereby control ozone levels, a well-tuned vehicle is essential. Clean spark plugs and a proper ignition setting all help the engine to burn fuel more efficiently. Not only will these steps cut down on hydrocarbon emissions, but they'll also improve gas mileage and save money.

In order to attain NAAQS standards, Connecticut must reduce its hydrocarbon emissions to 86,770 tons per year, a reduction of 106,050 tons per year from the present emissions. The federal regulations requiring new cars to have special emissions control systems should reduce the problem by 26 percent by

1982 and by 84,644 tons per year by 1987. Combined with the anticipated 9,320 ton per year reduction from AIM, and an additional 17,086 ton per year reduction from various other hydrocarbon control strategies, Connecticut should thus be able to comply with the hydrocarbon standard by the 1987 extension deadline. Along with the improvement in air quality, and the resulting savings from reduction of pollution-caused material damage, crop losses, and health problems, annual savings of $25,000 on gasoline consumption can also be expected because of better-tuned vehicles.

Carbon monoxide is Connecticut's other serious pollution problem. This colorless, odorless toxic gas acts on the respiratory, cardiovascular, and nervous systems. When inhaled, carbon monoxide combines with the hemoglobin in the bloodstream, taking the place of oxygen. Carbon monoxide is a by-product of incomplete or inefficient combustion. It is produced in excess when not enough air is allowed to enter the engine during combustion. Stuck chokes, dirty air filters, and poorly adjusted carburetors will all limit the amount of air entering the cylinders and cause excessive carbon monoxide release.

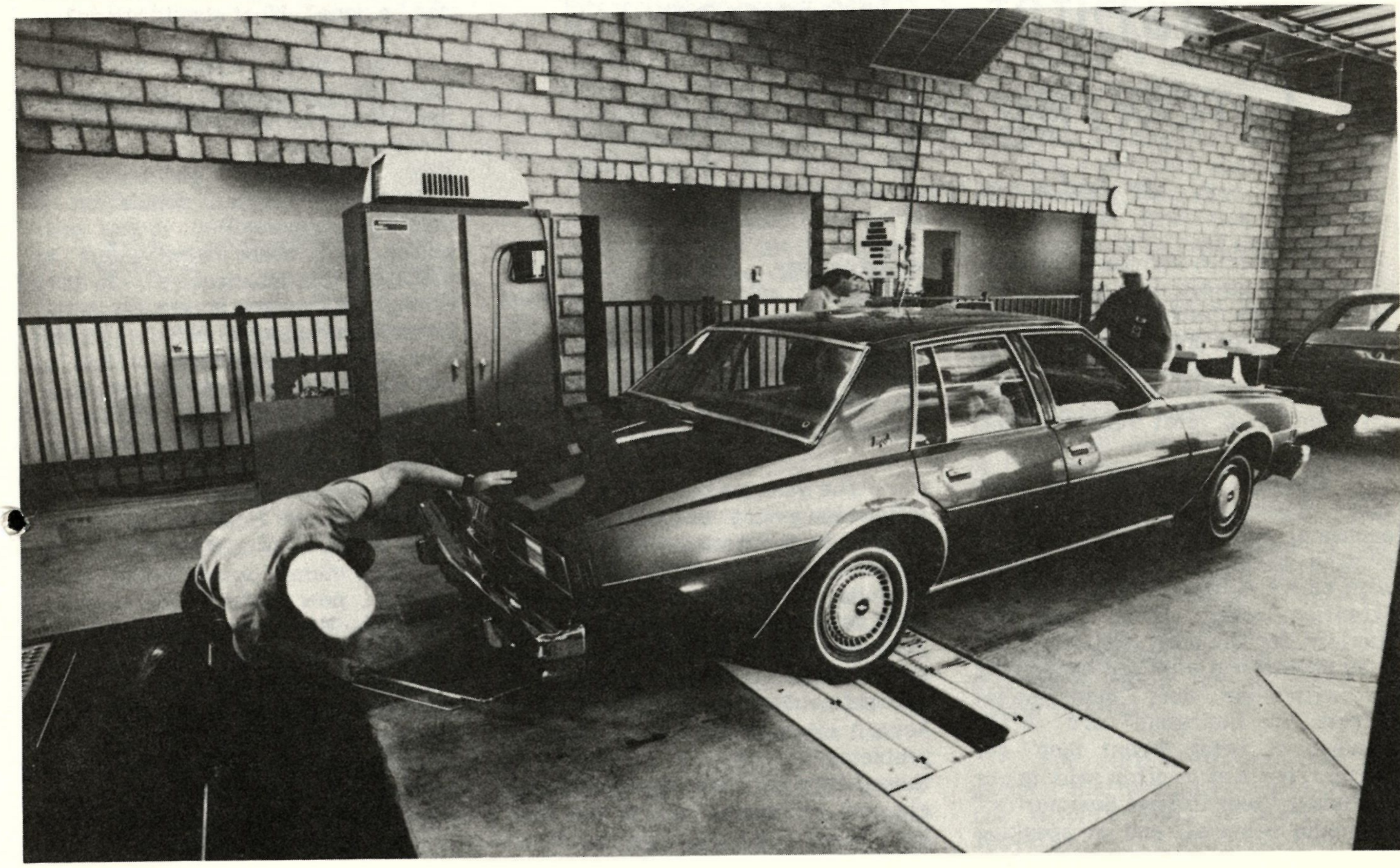
Carbon monoxide problems tend to be very localized, and carbon monoxide levels fluctuate rapidly. It is, therefore, harder to measure the carbon monoxide problem. According to Robert Waz of DEP's Air Compliance Unit, the AIM program should reduce carbon monoxide emissions by 20 percent. In combination with other carbon monoxide reduction strategies such as right-turn-on-red, increased use of public transportation, and traffic flow improvement, the AIM plan is expected to reduce carbon monoxide levels to acceptable EPA standards.

Although the majority of vehicles on the road will be included in the AIM program, there are exceptions. Motorcycles, motorized bikes, vehicles with temporary registrations, off-road vehicles, pre-1968 vehicles, non-gas-propelled vehicles, heavy duty trucks over 10,000 pounds, and vehicles under one year old will be exempt from the inspections.

All gas-powered vehicles on the roads, whatever their type or model year, will continue to be subject to the State's visible emissions regulations. If DEP Air Compliance Unit field inspectors spot a smoking vehicle, they record its registration number, type and description, the location and direction of travel, and the time it is observed, and the owner is sent a notice of violation. The owner has 14 days to respond by filling in and returning a form indicating what corrective measures were taken. If the form is not returned to the DEP, the problem vehicle is referred to the Motor Vehicles Department for follow-up, which can range from the vehicle's being called in for an inspection to its having its plates impounded.

Public awareness and cooperation will play a vital part in the success of the AIM program. To encourage public support, the Connecticut Lung Association will be conducting a public information program called "Project AIM" under a grant from the federal Environmental Protection Agency. ■

*Inspectors at a computerized test center in California check a car's exhaust emissions. It's expected that Connecticut will have approximately 23 stations around the State, with about 50 testing lanes.*



Photo, courtesy of Hamilton Test Systems

Paul Herig

# Laws, Regulations Keeping Pace With Habitat Changes, Growing Deer Herd

*By Paul Herig, Chief, DEP Wildlife Unit*

In previous articles, Connecticut's five-year-old deer management program has been discussed from varying angles including our aerial surveys, the operation of biological check stations, lottery permit issuance, and, most recently, deer damage.

During the past several years those opposed to hunting have, on occasion, attempted to sabotage hunting areas by littering forests with hair and have generated media attention over their concerns. Hunters, for the most part, however, have understood what has been going on with our deer management efforts. Biologists are often accused of being "front men" for hunters, but I have often said, in our published "Deer Project Summaries," in media releases, and at speaking engagements, that as a wildlife biologist, I will always put species welfare first. The sportsman will not be given the opportunity to jeopardize or eliminate the species. He wouldn't want to, and history reveals he never has.

The vast majority of the population have not become involved. They take the position that hunting is a matter of personal choice, and they do not intend to impose their opinions so long as the species is not endangered and the hunting methods employed are biologically regulated and safe. But many citizens have never experienced deer damage problems in the past as severe as those occurring now. Many of these citizens refuse to accept the fact that habitat change, as a result of forest and fuel wood cutting, is the culprit, and they blame the biologists.

The Wildlife Unit and the 1979 General Assembly have made strides in attempting to satisfy the various classes of citizen needs while at the same time protecting our deer resource. This is conservation. This is what wise use of renewable natural resources is all about. And this is how scientific wildlife management proves itself.

Several years ago, when we looked at deer records, it became clear to us that the deer population was expanding. It also has become evident that land use practices in this state are changing, particularly those associated with farming and lumbering since Connecticut's forests are at an age ripe for increased harvest. It is obvious too that the deer population is responding to the habitat changes. In 1974 legislation was adopted which allowed us to manage the State's deer resource. Several questions were posed at that time: Will the deer population continue to increase? If so, for how long? How much habitat is available? In what condition? How long will these habitat conditions continue? What can be done? What should we do?

In 1979, after collecting hundreds of thousands of pieces of deer data, we can answer some of these questions.

Yes, the deer population is increasing. In 1955-60, it was estimated that there were 6,000 to 8,000 deer in Connecticut. In 1974 through 1978, the statewide aerial surveys revealed 19,000 to 22,500 deer were overwintering. Add to this fawn production, and approximately 30,000 deer are present at the beginning of the summers. This increase should continue for at least six to eight years, even if not another timber tree or cordwood trunk is cut. It would take that long for the stump sprouts and once dormant, now sunlit seeds to grow out of reach of browsing deer.

At present, new habitat is being created every time a chain saw starts or a new house is built in an existing woodlot. There are some small areas where excessive deer browsing occurs, but by and large the deer habitat in Connecticut is in very good shape, as demonstrated by high fawn production and the physical condition of the deer.

We do not know exactly how many acres of habitat is available, but we do know that 62 percent of the state is forested and that in the last seven years the volume of timber harvested has increased from twenty million to sixty million board feet.

Armed with facts regarding deer breeding potential, age classes, biological condition, sex ratios, fawn production, landowner damage complaints, hunting application requests, motor vehicle deer kills, and the rise in illegal activity (i.e. poaching) which follows population increases, biologists have been keenly aware that changes needed to be made. Previous records and four years of data collection show that the deer population expansions that have occurred in other states as a result of habitat alterations are now occurring in Connecticut. Rather than waiting until the entire ecological system was affected, statutory and regulatory changes were made.

The following are many of the new 1980 provisions in the deer laws and regulations:

## Deer Damage Permits

1. Qualified landowners with $500.00 incomes from Cultivated Commercial Commodities who are experiencing severe deer damage may obtain six deer damage permits by submitting a special notarized application form available from the Wildlife Unit. (This will provide the commercial agricultural producer increased opportunity to solve deer damage problems if he is losing part of his taxable income due to severe deer damage.)
2. Permits are valid for the calendar year of issuance, rather than for four months. No pre-inspections are required. However, properties may be checked, and permits will be reviewed and revoked for cause. Law enforcement action could follow.
3. Landowners may continue to use designated agents for taking deer. However, no person may be a designated agent for more than one landowner. (The abuse of the designated agent provision is thought to be a contributing factor in the high illegal deer kill and it has been used as a trophy hunting system. Some individuals have held enough permits to take more than 20 deer.)
4. The commissioner may specify the type of hunting implement and ammunition which shall be used to take deer under the damage permit when public safety could be jeopardized.

## Deer Management and Associated Regulations

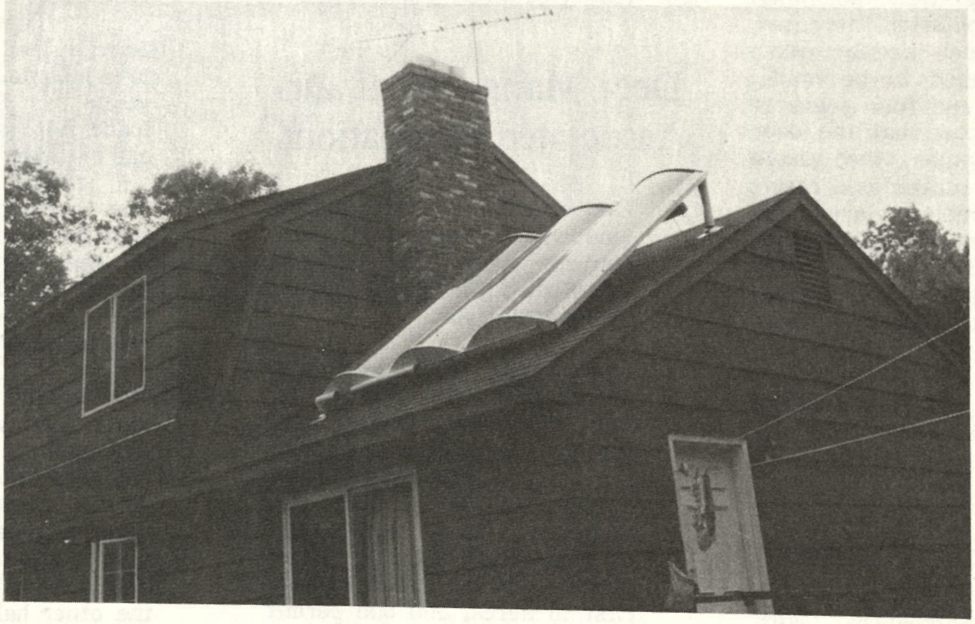
1. Cooperative State-private landowner regulated deer hunting areas can now be established to help control deer populations.
2. Landowners and their lineal descendants are eligible for free "Personally Owned Land Firearms Deer Season" permits for using a rifle, shotgun, or muzzle loader on their own property from November 1 through December 31. One permit will be issued for the first 10 acres, and one permit for each 20 acres thereafter, provided sufficient acreage is available. Only one permit per person may be issued, however.
3. Landowners need not come to mandatory deer check stations, but are required to report deer kills by mail within 24 hours.
4. The landowner can determine if hunting on his land will be by shotgun or rifle (6mm or larger) during the regular 15 day private land shotgun deer season. (Rifles are not permitted on State land.) This permission will be indicated on the Landowner Consent form.
5. Possession of muzzle loader projectiles other than round ball will be illegal, as will be the use of telescopic sights on muzzle loaders.
6. Possession of mechanical archery release devices will be illegal.
7. The 1980 archery season will be a straight season starting one-half hour before sunrise on October 1 and continuing through sunset the day before Thanksgiving.
8. Each of the four different types of paid deer permits will have a deer tag attached so that a person holding more than one permit can legally take more than one deer per year. Types are: archery; private land shotgun; private land muzzle loader; State land shotgun or State land muzzle loader. No more than one deer can be taken on each permit.
9. The every-other-year exclusion for successful permittees in the State land shotgun lottery is eliminated. (Thus 1979 permittees may enter the 1980 lottery.)
10. The shotgun lottery season on State land will be split into two segments of six days and nine days duration during the normal 15 day period. Thus twice as many persons may be selected in the lottery, with half hunting for six days and the other half hunting the remaining nine days. (This will provide sportsmen more opportunity to hunt each year.)

It is anticipated that the new system will put more deer into the season bag as well as helping to reduce property damage, especially to commercial agricultural operations. It will also provide more days of recreational opportunity to Connecticut sportsmen. It should also help reduce poaching. The more people that have a stake in our valuable deer, the more difficult it should be for "wildlife thieves" (poachers) to get away with their crimes. Thousands of new legal eyes and ears afield should make it harder to steal.

For further information regarding the new provisions, contact the Wildlife Unit, at 566-2841 or 566-4683. ■

# Solar Energy: Getting It Into Domestic Hot Water

*By Randy Sheinberg, Massachusetts Audubon Intern*



Does this look like your house? It is a two-story, gambrel design colonial not unlike many other colonials that dot the Connecticut countryside. Its interest lies in its energy saving features. These include a wood stove and a Heatolator fireplace, perfect orientation to geographic south, its having no north windows on its second floor, and a dark paint job and roof.

The house, located in Monroe, Connecticut, was built in 1978 by Vic Yanosy of DEP's Air Monitoring Unit. Besides the other solar energy features it incorporates, the house uses solar energy to heat its domestic hot water.

Solar energy systems are classified by the way in which they operate -- as either passive or active systems. The active system uses an energy source other than solar energy to transfer the solar energy to an area where it is needed. In active systems, pumps and fans are often used.

Yanosy's domestic hot water heating system is an active solar system. It consists primarily of collector panels, a storage facility, and a transfer system. It is something that can be installed on almost any house, with varying degrees of efficiency.

One of the first things you notice about the Yanosy house are the three black collector panels mounted on the roof. These consist of a black absorber plate to collect the sun's energy and a shatterproof acrylic cover to trap the heat. In order to capture the maximum amount of the sun's energy, the panels face south and are mounted at an angle approximately equal to the latitude of the house's location. Since Yanosy's roof is not pitched at a steep enough angle, the collectors are raised on wood planks to the proper angle. Collector panels may also be placed on the ground adjacent to a house.

Within the black absorber plates of the panels are tubes filled with a heat transfer medium to trap the heat and bring it to areas throughout the house where it will be used. The transfer medium used can be air or water, but in most domestic hot water systems water is used. If the house were in a warmer climate, the actual domestic water used in the house could be pumped up to the roof, heated directly in the collector panels, and pumped down to the sinks and showers for immediate use.

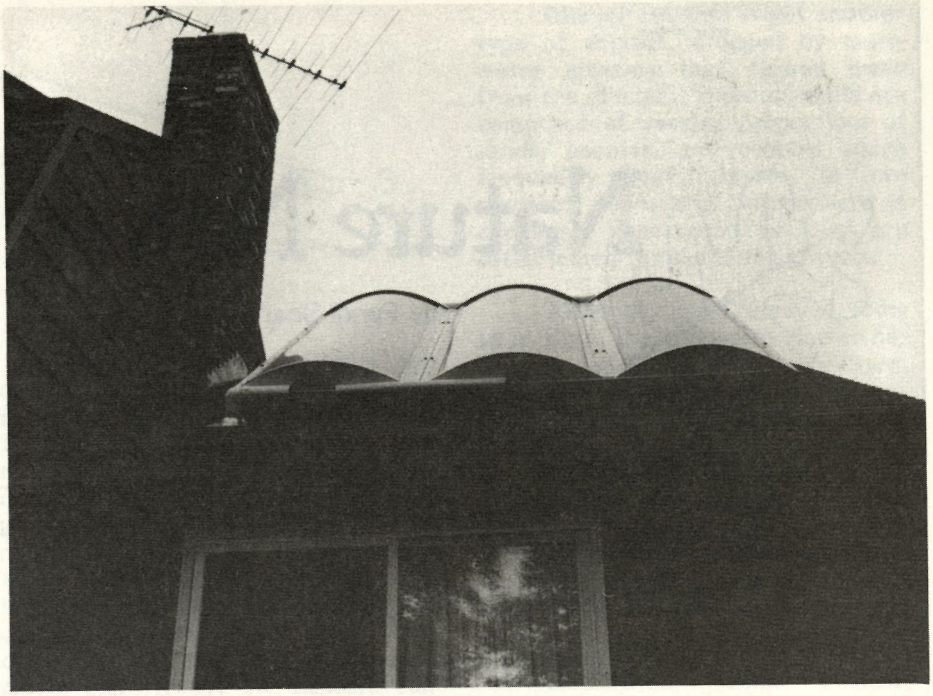
In Connecticut, it is not that simple. Temperatures at this latitude often fall below freezing. Water pumped to the roof in the winter would freeze, making the system inoperable. Instead of water, a combination of water and antifreeze is used as a transfer fluid in Yanosy's system. The transfer fluid passes through the collectors on the roof, where it is heated directly by the sun. It then travels to the solar domestic hot water tank. The heated liquid circulates around the domestic hot water in the tank.

Although Yanosy's solar heating system does a substantial amount of the heating of domestic water, a backup system is needed. Yanosy uses an oil-fired system. Water flows first into the solar water tank, where it is heated by the transfer fluid. It then enters the oil-fired tank. If the temperature is already hot enough, the water will then proceed to the main pipes and on to the faucets. If it is not, the oil-fired system activates to heat the water to the desired temperature. Yanosy says, "Water comes in from the solar system at 120 degrees Fahrenheit pretty regularly. That temperature is sufficient for most household uses. If it weren't for the dishwasher, which operates at 160 degrees F, we wouldn't need the oil system at all for a good part of the time." During sunny periods in the summer, for example, when picnics meant the Yanosy family could depend less on their dishwasher, they turned off the backup system for substantial periods.

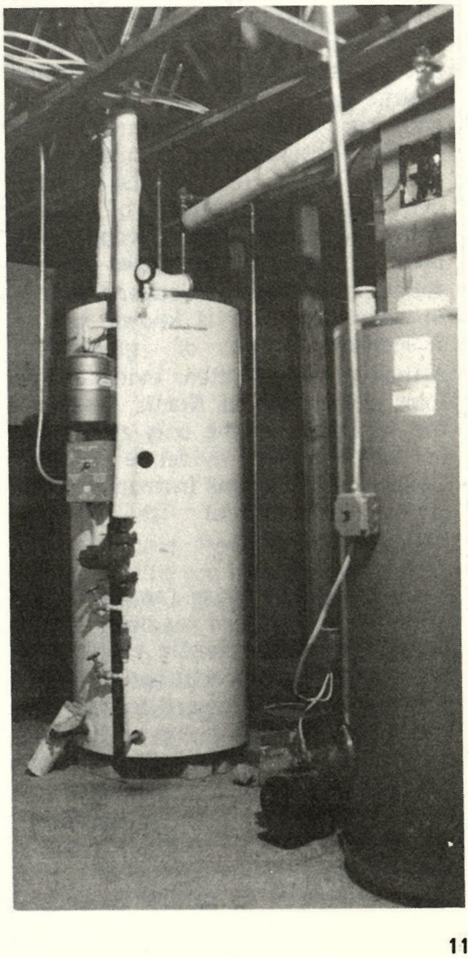
Most people consider cost the biggest drawback in installing a domestic solar hot water system. Although these systems do demand a high initial capital investment, they probably save money in the long run. "When I first installed my system in February 1979, the payback period was about ten years. But now, with the high price of fuel, it has already decreased to seven years," says Yanosy. The cost of the system depends also on how much of the hot water heating is done by the solar system. For Yanosy's five-person houshold three solar panels provide approximately 53 percent of the family's hot water heating. Two panels would have provided only 48 percent, not enough to qualify the installation for a $400 grant he applied for.

Yanosy's solar installation cost him $2,000, $1,600 for the equipment and $400 for labor, when it was installed in February 1979. Prices vary depending on the system installed and on the suitability of the house for solar energy. Since Yanosy's house was constructed with the intention of having a solar system installed, it was designed to accommodate one. Other older houses might require renovations, such as more insulation, before a system could practically be added.

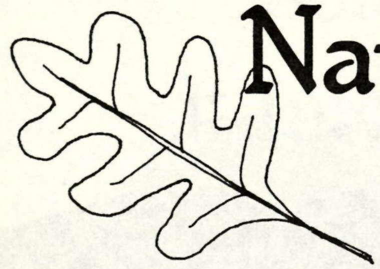
In 1979 the Connecticut Legislature passed a package of bills designed to provide incentives for solar installations. There are property tax exemptions, tax credits, and low-interest loans available. For up-to-date information on Connecticut solar legislation, contact the Connecticut Solar Coalition, 230 Washington St., Box G, Hartford (527-7191). For general information and advice about solar installations, call the toll free National Solar Information Center at (800) 523-2929. NESEC, the Northeast Solar Energy Center, is also very helpful in providing information on solar energy in the Northeast. Write to them at 70 Memorial Drive, Cambridge, MA 02142. ■



*Transfer fluid is heated in the solar panels on the roof and pumped to the solar water tank, left, where it heats domestic hot water. Water passes to oil-fired tank, right, and, if not sufficiently hot, is heated further to the desired temperature.*



Vic Yanosy photos



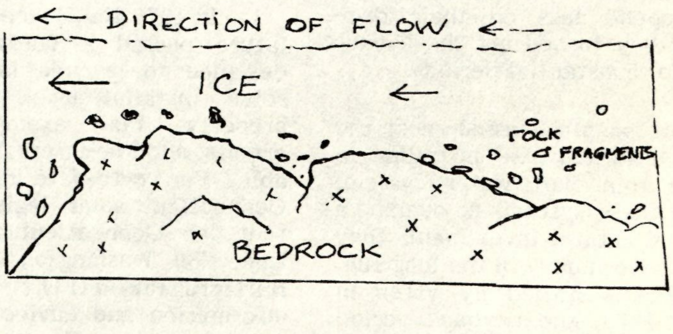
# Nature Notes

by Penni Sharp

## Wisconsin Glacier Instrumental In Today's Topography

As Connecticut residents gear up to face a cold winter and look out upon a bleak landscape, one may reflect upon the fact that much of our present day landscape was shaped during the Pleistocene Epoch which began about two million years ago and ended some twelve thousand years ago. This was an era in geologic time characterized by severe fluctuations in climate which caused great ice sheets to repeatedly cover much of North America and northern Europe. The most recent in the series of ice sheets, or glaciers, to cover the area in which we live is known as the Wisconsin Stage of glaciation. Although there is clear evidence for four glaciations in North America, the Wisconsin is the only glaciation for which present evidence exists in Connecticut. It was instrumental in giving Connecticut its present topography.

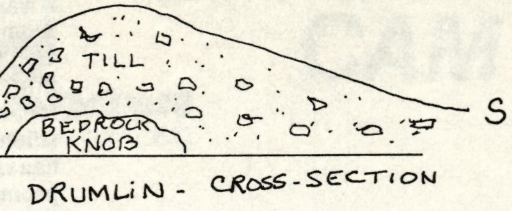
The exact cause for the formation of glaciers has not been determined, however climatic events and the drifting of continents from warmer latitudes toward colder ones and vice versa are believed to have contributed to the development of the great sheets of ice. Glaciers are an integral part of the water cycle. Water evaporated from the seas, became part of the atmosphere, and then condensed to return to earth. The surface temperature of the earth was low enough so that the precipitation fell in the form of snow which froze and accumulated to form great masses of ice. During glacier formation little or no water was returned to the seas, and this resulted in a general lowering of sea level. In this area, sea level was as much as 100 meters lower, and the continental shelves were exposed as land. When the glaciers melted, sea level rose, and today it is still rising at a rate of about three millimeters a year.

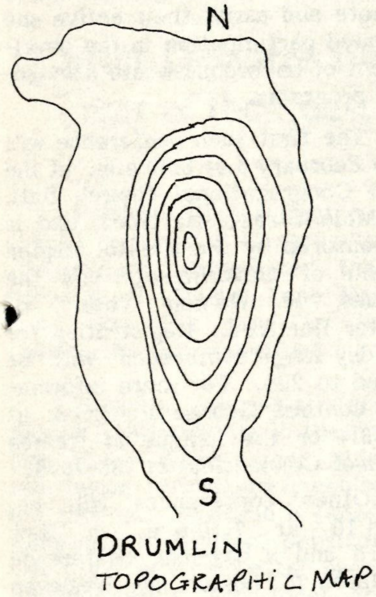


This is one way in which glaciers alter the landscape, but the greater influence on the terrain comes from the movement of a glacier. Pulled upon by the force of gravity, a glacier moves in two manners. In one kind of movement, the entire mass slides along the ground much as snow slides down a steep roof, and in the other movement, known as creep, a slipping motion between individual ice crystals causes a slow downslope trend.

As it moved over Connecticut, the Wisconsin glacier was, at some points, nearly two kilometers thick! On its way, it eroded, transported, and deposited a variety of sediments known as "drift." It came to rest along the center of present day Long Island on a line known as the Ronkonkoma Moraine. This is a terminal moraine, and it marks the spot at which the ice margin stood for a long time. At this point, the glacier was in a steady state in that the amount of ice accumulating was equal to the amount that was wasted, or lost, as meltwater. A ridgelike accumulation of drift is the clue that indicates the one-time presence of a terminal moraine. On the north shore of Long Island there is another terminal moraine, known as the Harbor Hill Moraine. It extends eastward across several small islands to Fisher's Island, and its presence indicates that a warming period caused the glacier to recede quite a distance to the northern edge of Long Island where it again reached equilibrium and remained for some time. In Connecticut, there are lesser moraines in Madison and Old Saybrook which tell us that the glacier paused here a short while before it retreated permanently from Connecticut.

While on its way down to cover Connecticut, the Wisconsin glacier exerted considerable force on existing land features. It scoured and scraped, plucking off blocks of bedrock and cliffsides. It smoothed hills and widened valleys. The



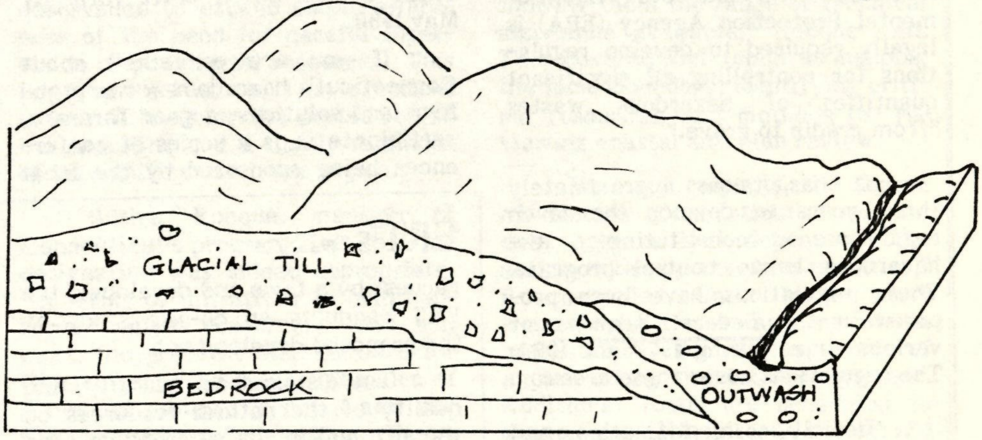


material that it carried was ground up under the glacier and deposited. As mentioned before, the unconsolidated material transported by a glacier is known as drift. Drift occurs in two basic forms: till, which is non-sorted drift and is deposited directly by the ice, and stratified drift, which is sorted and stratified and dropped by glacial meltwater.

Special terms are used to describe some of the glacial deposits. For example, a drumlin is a long, narrow hill of glacial till that runs in the direction of ice flow. These streamlined hills were formed when advancing ice encountered obstruction such as bedrock knobs. Drumlins are a common land form in Connecticut. Examination of a topographic map will show where these long hills are found.

A glacier erratic is a term used to describe a deposited rock whose composition differs from the indigenous bedrock. The presence of foreign rock in any given area can attest to the distance that the glacier carried its load. Many erratics are enormous and weigh several tons. These could only have been transported by moving ice.

Other glacial landforms indicate that the melting process was in effect while they were formed. For example, kames and kame terraces are deposits formed from ice-contact stratified drift. As a glacier melts, its edge becomes nearly motionless and flowing meltwater courses over the stagnating ice. The meltwater leaves a deposit of stratified drift which slumps and collapses as the ice underneath slowly melts away. The deposits can be recognized by their poor sorting, abrupt changes in grain size, and uneven surface form. Bodies of ice-contact stratified drift are categorized according to their position and shape. Kame terraces occur on the sides of valleys and are terrace-like formations. A kame denotes a hummock or short steep knoll. Another ice-contact deposit is an esker which is a long and sinuous narrow ridge.



Many Connecticut ponds and swamps owe their origin to glaciers. A kettle or ice-block lake formed when a block of ice broke off from the retreating glacier and melted in place creating a small lake or pond. Many of these ponds lacked natural outlets and have since become swamps or marshes or disappeared altogether.

Glacial outwash is yet another type of deposit, dropped by meltwater streams that flowed away from the glacier. These deposits are composed of varying proportions of sands, pebbles, and cobbles which frequently occur in layers. In Connecticut, deposits of outwash are of economic importance as they are often mined for sands and gravels.

Although long removed from us in time, the Wisconsin glacier has had its effect on our daily lives. Stratified drift aquifers provide prolific sources of groundwater and outwash sands give us materials used in road building and construction. But perhaps the presence of the glacier is felt most keenly by Connecticut gardeners and farmers who, in some parts of the state, encounter its bouldery till with every turn of the spade!

If winter seems endless, stretch your imagination 12,000 years back in time . . . compared to a mile high sheet of ice, a few inches of snow is a mere nothing.

*After reading November's "Nature Notes," would you like to know more about mushrooms? Its president, Joe Pratt, says you might be interested in contacting the local mushroom hunting and studying club. For information, write Mr. Edward Bosman, Membership Secretary, Connecticut Valley Mycological Society, 169 Edwards Road, Cheshire, CT 06410. The society sponsors forays, identification sessions, workshops, and indoor programs.* ■

# For Your Information

By Martina Delaney,
Citizens' Participation Coordinator

## Conferences Focus On Hazardous Wastes

A nationwide effort is under way to protect human health and the environment from the effects of mishandled hazardous wastes. Under Subtitle C of the Resource Conservation and Recovery Act of 1976 (RCRA), the U.S. Environmental Protection Agency (EPA) is legally required to develop regulations for controlling all significant quantities of hazardous wastes "from cradle to grave."

It has taken approximately three years to develop the seven regulations constituting the hazardous waste control program. These regulations have been proposed in the Federal Register at various times during 1978 and 1979. The regulations cover these areas:

- Definition, identification, and listing of hazardous wastes (section 3001)
- Standards applicable to generators of hazardous wastes (section 3002)
- Performance, design, and operating requirements for facilities that treat, store, or dispose of hazardous wastes (section 3004)
- A permit system for such facilities (section 3005)
- Guidelines to assist states in developing their own hazardous waste programs and procedures for obtaining EPA authorization for their programs (section 3006)
- Procedures by which hazardous waste generators, transporters, and facility owners/operators notify EPA of their activities (section 3010)

The DEP is in the process of developing the regulations to implement the RCRA in Connecticut. These should be in draft form by May 1980.

If you are concerned about Connecticut's hazardous waste problems and solutions, a good forum to participate in is a series of conferences being sponsored by the local League of Women Voters through a Public Service Science Residency Award received by Kathleen Golas from the National Science Foundation (See CB, July/August 1979, p. 15). The conferences are designed to increase public understanding of the scientific and technical aspects of hazardous waste management and to promote and assist their active and informed participation in the development of hazardous waste management programs.

The first such conference will be on February 8 at 8:30 a.m. at the South Congregational Church Hall, 277 Main Street, Hartford, and is co-sponsored by the Capitol Region Council of Governments and the Leagues of Women Voters of Greater Hartford. Registration for the day-long conference will be limited to 200. For more information, contact George Pohorilak at 522-8314 or the League of Women Voters of Connecticut at 288-7996.

Other conferences will be: March 10 at 7:30 p.m. in New Milford and a day-long conference on March 28 hosted by Wesleyan University in Middletown and co-sponsored by the Midstate Regional Planning Agency.

Contact the League of Women Voters for details. ■

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## ERT's

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request by a town and developer, the ERT conducts an on-site study of the proposed development.

The distribution, quantity, and quality of the natural resources on the site and in the surrounding area are evaluated by each discipline with respect to their ability to support the proposed development and the probable effects of the development on the natural resources. Final ERT reports present only factual information highlighting potential problems, limitations, alternatives, opportunities, and areas of possible trade-off. The ERT does not act as an advocate of one point of view or another but rather strives for balance and objectivity.

Connecticut's Environmental Review Teams act only in an advisory capacity, with decisions being made by the town and the landowner or developer. The ERTs do not compete with private consultants by providing finished site plans. Their function is to represent the public interest by indicating the need for and the advantages of applying sound conservation principles to a development. Advice of a preventive nature early in the design of a proposal makes it possible to avoid long-term, costly corrective or regulatory problems in the future.

The Eastern Connecticut and King's Mark Environmental Review Teams supply services many towns are unable to provide through their own staff resources as well as acting as impartial bodies providing factual information about development proposals the teams have been requested to review.

This year the principal problem continues to be difficulty in obtaining technical staff assistance from overburdened cooperating agencies.

For additional information, contact Richard Lynn of the King's Mark Environmental Review Team at 868-7342 or Jeanne Shelburn of the Eastern Connecticut Environmental Review Team at 889-2324. ■

coastal
area
management
71 capitol avenue hartford. conn. 06115

# CAM NEWS

## Carter Declares 1980 "Year of the Coast"

President Jimmy Carter, in his second message to Congress on the environment, emphasized the importance of Coastal Zone Management and the need to further develop the national effort.

"Despite substantial state and federal achievements in the protection of our coastal zone, this rich and unique recreational, ecological, and economic resource is faced with increasing population, development, and other environmental pressures. Federal, state and local governments need to continue strong and coordinated efforts to address these pressures and to assure that our coastal area is protected and developed in a balanced manner," he stated. "The 'coastal challenge' -- the balancing of conflicting land uses -- is formidable," he said. "It requires a coordinated federal-state-local response."

In a move to underscore the importance of the issue, Carter also declared 1980 the "Year of the Coast."

In doing so, the President gave a substantial boost to coastal management and to a burgeoning, nationwide organization specifically interested in coastline conservation. The "Coastal Alliance," which is headquartered in Washington, D.C. and began in 1979, presently consists of a network of interest groups, citizens, officials, and agencies from across the U.S. The aim is to raise public consciousness about the values of the coast and the critical need for conserving coastal resources through public designations, displays, and coastal events. Aside from the Year of the Coast designation, the coastal alliance has expanded to include official contacts in nearly forty states, with hundreds of coastal events planned.

In Connecticut, Governor Ella Grasso likewise declared 1980 the "Year of the Coast" -- a particularly fitting declaration for Connecticut because 1980 marks the start of implementation of the state's Coastal Area Management Program, with federal approval expected sometime during the same year.

"I am proud to designate 1980 as the Year of the Coast," Governor Grasso said, "in recognition of the innumerable ways in which our coastal resources have shaped our history and their vital influence on the future of our State and nation. This year the United States government is sponsoring a special observance to expand public awareness of the need for careful supervision of our coastal resources. This important initiative is an excellent means of assuring the protection of our shoreline and a timely reminder of its significance in our region."

Arthur Rocque, manager of Connecticut's program, felt that the designation was indeed appropriate. "In terms of initiatives to help conserve coastal resources, 1980 will mark the greatest step forward for Connecticut," he said. "The idea of a coastal alliance is not a new one for Connecticut," he added, "We've had a network of supporters of coastal management for several years, and much of the program's success is directly attributable to that support, from both the public and private sectors."

The Coastal Management Act, which Governor Grasso signed into law last June, became effective January 1, 1980. Workshops were held by the CAM Program last month to acquaint municipal and state officials with their responsibilities under the Act. And more workshops are anticipated throughout the year. "On the municipal level, the workshops were aimed at informing local officials and at showing them the range of technical assistance available," Rocque said. They covered such topics as mapping the local boundary, identifying critical resources, and methods for reviewing coastal site plan review.

"In many respects, the degree of success Connecticut's program does achieve will depend on the action taken by the municipalities," Rocque added. Under Connecticut's Act, coastal towns each receive an initial $2,500 for start-up costs of implementing coastal management. Additional funds are scheduled to become available later in the year. ■

## To Add or Not to Add: Report Says, "Spare yourself and your septic system."

*By Tess Gutowski, Publicist, DEP Water Compliance Unit*

Use of septic tank additives may be causing damage to your subsurface sewage disposal system and area groundwater. A Department of Environmental Protection report to the Board of Subsurface Sewage Disposal System examiners on available subsurface sewage disposal system additives cited the following major findings:

1) Inorganic compounds, organic compounds, biological cultures, and synthetic soil conditioners should not be added to enhance the performance of subsurface sewage disposal systems because they are detrimental to the systems or give no beneficial effects. Specifically:

   a. Acids should not be used to clean septic tanks or improve sewage percolation through soils partially clogged with grease-like scum. They

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## Septic Additives

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give no benefits and may harm the system.

b. Enzymes should not be added to septic tanks to enhance digestive action or to dissolve grease. Use of these products can result in excessive mat growth and cause system failure.

c. Yeast should not be added to septic tanks because it gives no beneficial effect.

d. Biological cultures should not be added to septic tanks because they can interfere with the process of settling solids.

2) Until tests have been conducted to determine if solvents have any desirable effects on subsurface sewage disposal system performance and the results have been published, the use of any solvent is not recommended.

a. Solvents (i.e. chlorobenzene) can dissolve greases in septic tanks, prevent grease buildup in leaching fields, and degrease house sewers.

b. Chlorobenzene, however, has been identified as a carcinogenic (cancer causing) substance and should not be introduced into the groundwaters.

c. No substance which may result in groundwater contamination with solvents or hydrocarbons should be used.

3) There are no products on the market for which any evidence has been presented to the DEP that they are safe and effective in cleaning or enhancing the performance of septic systems.

Complete copies of this report may be obtained by contacting: Tess Gutowski, Water Compliance Unit, DEP, 165 Capitol Avenue, Hartford, CT 06115. ■

# 208 water quality management

## 208 Hazardous Waste Study Update

In the previous month's Citizen Bulletin, the results of the Inventory of Hazardous Waste Generation and Disposal, conducted by the Connecticut 208 Program, were presented. The Inventory has accounted for nearly 100 million gallons of these wastes which are generated annually in the State. Since Connecticut does not now have disposal facilities which will meet the criteria of the soon-to-be-promulgated regulations of the Federal Resource Conservation and Recovery Act (RCRA), the 208 Program has devoted the lion's share of its efforts to developing such facilities.

To oversee the efforts of the 208 Program, a Hazardous Waste Management and Recovery Task Force was formed. The Task Force, chaired by DEP Commissioner Stanley J. Pac, comprises representatives from industry, State and local government, environmental organizations, and citizens' groups. It has provided valuable technical assistance throughout the study and will certainly prove to be an important vehicle for the implementation of the final facility recommendations.

A technical consultant, The Research Corporation of New England (TRC), was retained to prepare a series of reports. The aforementioned inventory is the first of these documents; additional individual reports on the legal and institutional analysis of Connecticut's existing management and regulatory framework, public participation, facilities needs, and siting considerations have either been released or are currently undergoing final revisions prior to release. A final report will also be prepared which will contain pertinent data from each of the individual reports and will contain the final recommendations for Connecticut's overall hazardous waste management program.

The Legal and Institutional Analysis has examined, in depth, the various alternatives for facility ownership and operation as well as the existing regulatory framework for hazardous waste management in Connecticut. The study concludes that the DEP generally has sufficient regulatory authority at present to manage hazardous wastes. Some additional statutory authority in the area of enforcement may be required for Connecticut to receive EPA authorization of its hazardous waste program. The amendments would be necessary to increase the civil and criminal penalty limits to be consistent with those required under the RCRA.

The study has also examined the various facility ownership and management options available to Connecticut. These include private ownership and operation, public ownership and operation, ownership and operation by a quasi-public agency such as the Connecticut Resources Recovery Authority, or the public utility approach -- a set of franchises with territorial limits and regulated user rates.

The 208 Program believes that the initial impetus to develop hazardous waste treatment and disposal capacities should and will come from the private sector. The demand exists; the private sector has the necessary technological and business expertise; private facilities, if closely regulated, can be as environmentally sound as public facilities. If necessary, government involvement can take the form of financial incentives. However, the government should first attempt to streamline the various permit processes involved in establishing such facilities and to help solve the siting dilemma.

The siting dilemma is presently the most significant impediment to construction and operation of hazardous waste treatment and disposal facilities anywhere. In next month's Citizens' Bulletin, the third, and final installment of this series will examine the problems of siting such facilities and the efforts to date to solve such problems by the Connecticut 208 Program. ■

By Joseph M. Rinaldi,
208 Public Participation Coordinator,
P.O. Box 1088, Middletown, Ct. 06457

# DEP 1979 Annual Report

What do they do at the DEP? The following, excerpted from the 40-page Annual Report to the Governor, are a few of the activities and accomplishments logged by the Department of Environmental Protection's Division of Conservation and Preservation, Division of Environmental Quality, and support service units during fiscal 1979.

* The Coastal Area Management (CAM) program completed its fourth and final year of developing a coordinated management plan for the State's coastal land and water resources, and enabling legislation to implement a comprehensive coastal management program was passed by the 1979 General Assembly.

* Several major studies of coastal resources and their management were completed by the CAM Program, including a model municipal coastal program and a shoreline erosion analysis.

* The CAM Program initiated five urban planning grants in four cities providing for revitalization of under-utilized urban port areas, urban coastal recreation, and commercial fisheries.

* The Information and Education Unit's Environmental Education program initiated a program of regional liaison to provide assistance to teachers and school systems wanting to incorporate environmental education into their curricula.

* Hunting Safety and Boating Safety programs provided 8,500 packets of boating safety education materials to students and instructors and 400 packets of hunter safety instruction materials to hunter safety instructors as well as awarding certificates to 1,050 youths completing Boating Safety courses and certifying over 2,850 first-time hunters upon their completion of safety courses.

* The Natural Resources Center's Geological and Natural History Survey continued to compile systematic inventories of basic natural resource data in physiography, hydrology, biology, atmospherics, and earth materials.

* The Natural Resources Center was given administrative responsibility for the new State Intergovernmental Cooperative Climate Program with the National Oceanic and Atmospheric Administration and the Endangered Species Cooperative Program with the U.S. Fish and Wildlife Service.

* A third series of land use seminars on natural resource systems was conducted by the Natural Resources Center in the Waterbury and New Haven areas, for members of town commissions and boards.

* The DEP's Open Space Acquisition Unit acquired 917.21 acres of land having a value of $1,558,946.50. This includes 132.56 acres for game management, 330.95 acres for parks, 453.70 acres for forests, and two easements for flood control structures.

More land, better fish, fewer fires, well watched wildlife. . .

* The Municipal Grant-In-Aid program assisted 41 cities and towns in their attempts to secure funding for the acquisition of park lands or for developing recreational facilities. Actual payments for acquisitions by towns during the year totaled over $3 million dollars in federal reimbursement and nearly $713,000 in State payments. Additional potential reimbursement for acquisitions could reach $3.8 million. Actual reimbursements for development projects exceeded $1 million and proposed improvements pose the potential for up to $3.9 million in additional reimbursements.

* DEP's Office of Planning and Coordination published the 1978-1983 State Comprehensive Outdoor Recreation Plan qualifying the State for $6.2 million in federal grants under the U.S. Land and Water Conservation Act.

* The License and Revenue Section issued licenses to lobstermen and commercial fishermen (6,088), small game hunters and sport fishermen (233,467) and deer hunters (14,463).

* The Fisheries Unit released 876,510 catchable trout, 395,000 Kokanee fry, and 184,198 Atlantic salmon smolts and supplied 2,296,000 disease-free brown trout eggs to other agencies.

* During fiscal 1979, 88 anglers received trophy fish awards.

* The Fisheries Unit's Quinebaug Valley Fish Hatchery completed design of a brood stock improvement program and tagged all brood fish for identification. The object is to produce faster growing fish of each species, increase egg production, and insure better fish survival after stocking.

* The Quinebaug Valley Hatchery's public fishing ponds were open on weekends and holidays, March through May, and 2,106 fishing permits were issued.

* Marine fisheries personnel began a survey of the marine

recreational fishery in Connecticut as well as spending over 150 man days in matters associated with the New England Fisheries Management Council which is charged with developing management plans for important marine species.

* The Forestry Unit sold more than 10,500 cords of wood under the cordwood cutting program. Revenue was some $42,000. More than 6,000 names were on permit waiting lists as of June 1979.

* About 2.5 million board feet of sawlogs were harvested on State lands, with revenue value of $136,000.

* There were 320 new certifications of forest lands for tax purposes issued, involving some 20,273 acres.

* State Forest Nursery production increased 30 percent over 1978, to 2.2 million tree and shrub seedlings. Connecticut residents bought, at cost, 2,366 Buffer Bunches, 469 Wildlife/Conservation Packets, and approximately 600,000 seedlings as planting stock for locally-grown Christmas trees. Seedling sales revenue in fiscal 1979 was over $94,000.

* Private landowners were given 1,548 on-site assists with forest management; a total of 22,600 acres were examined.

* A cool, wet spring made 1979 an easy year for forest fire control. There were 1,207 forest fires reported, burning 1,755 total acres, with an average fire size of 1.7 acres. Suppression efforts cost a total of some $59,000, including direct payments to local fire departments of $34,000.

* More than 300,000 pieces of Smokey Bear fire prevention literature were distributed, and Smokey costumes were used 60 times.

* Technical assistance provided by DEP's Office of Indian Affairs enabled the Golden Hill Indian tribe to successfully compete for federal funds to acquire 114 acres to enlarge their reservation, which previously covered one-quarter of an acre.

* Law Enforcement Unit field personnel, primarily conservation officers, made a total of 3,758 arrests and issued 2,044 warnings for violations of laws and regulations governing hunting, fishing, commercial fishing, and boating.

* A new maintenance building at Hammonasset Beach State Park was completed in March 1979.

* Two parcels of land, totaling 250 acres, were purchased for the Scantic River State Park.

* Over 1,000 new picnic tables were fabricated, distributed, and assembled at parks throughout the State.

* A new $5 seasonal pass for entrance to parks and boat launch areas was instituted.

* A new long-term lease was negotiated for continued operation of the ski area at Mohawk Mountain State Park where a new triple chair lift was installed in February.

* The Young Adult Conservation Corps has been maintaining and refurbishing the mansion and carriage house at Harkness Memorial State Park as well as constructing an amphitheater at the park.

* A boat camping facility was established on the Connecticut River at Hurd State Park.

* Land acquisition during the year placed total land under the Property Management Unit's administrative control at approximately 196,600 acres, distributed in 259 areas in 154 towns across the State. A total of 791 structures are also maintained.

* The Wildlife Unit counted 38,382 waterfowl during the winter and 278 adults and 139 young on 24 areas during the spring in mid-winter aerial surveys and spring brood counts.

* The Wildlife Unit also inventoried woodcock, quail, beaver, ruffed grouse, osprey, and bald eagles this year.

* The State's wild turkey restoration program reported an estimated turkey population of over 1,000, distributed over 500 square miles, going into the winter of 1978-79. During the year 15 birds were relocated to the Union-Asford area and 15 to the Barkhamsted-Granby area.

* A total of 161 black ducks, mallards, wood ducks, and black-mallard crosses were banded as part of the Atlantic Flyway banding effort.

* For Connecticut's fourth regulated deer hunting season, a total of 14,769 permits were issued, and 948 deer were taken by archers, muzzle loader hunters, and shotgunners. Deer killed by vehicles exceeded the hunting season harvest by 22 percent, with 1,161 deer reported killed on highways.

* The Wildlife Unit also issued permits including: 139 for possession of wildlife; 93 for custodianship of young, injured, or immature wildlife; 658 for game breeding; 49 for scientific collection; 67 for importation of wildlife; 365 for shooting at the State-owned range in Cromwell; 62 for volunteers who assist with nuisance raccoon problems; and 107 for field dog trails.

* To supplement native species, the Wildlife Unit released 35,211 pen-reared pheasants during 1978 and an additional 6,475 pheasants were released in cooperative programs with sportsmen's clubs.

* Wildlife Unit biologists assisted the U.S. Wildlife Service in relocating more than 200 nuisance Canada geese.

* The Air Compliance Unit prepared a revision of the State Implementation Plan for Air Quality (SIP) to be used by the

departments of Environmental Protection, Transportation, Motor Vehicles, and Economic Development to factor air quality considerations into all their administrative actions.

- The Air Monitoring Section continues to operate and maintain Connecticut's air monitoring network at 85 monitoring sites which provide the data for the daily Pollutant Standards Index.

## ...continuing the cleanup of the State's air, river basins, oil spills...

- The Air Compliance Engineering Section continues to evaluate all new stationary sources of pollution prior to their construction to insure that they comply with all necessary standards and examines Metropolitan Planning Organization transportation plans for consistency with air quality goals.
- The Air Compliance Enforcement Section conducts on-site inspections of facilities to determine their compliance with air pollution regulations and investigates complaints received from citizens.
- The Oil and Chemical Spills section of the Hazardous Materials Management Unit was on the scene at over 700 spills and accidents ranging from a 100,000 gallon oil spill to two major chemical warehouse fires.
- The Hazardous Wastes section is developing a manifest system for movements of hazardous wastes, locating old waste deposit sites that might pose hazards, and advising companies and individuals on hazardous waste disposal.
- The Pesticides section registers all pesticides, investigates pesticide accidents, and tested, certified, and licensed thousands of applicators during the year.
- The new Noise Control Unit received approximately 130 formal noise complaints, 104 of which were resolved and the remainder of which are under investigation.
- The Radiation Control Unit continues to make periodic inspections of the approximately 2,500 installations which register use of diagnostic and therapeutic x-ray equipment as well as annually registering all other sources of ionizing radiation including radioactive materials and other sources of x-ray.
- The Solid Waste Unit's Technical Assistance Section has made 47 site surveys of proposed solid waste disposal areas and transfer stations and issued 25 permits to establish and operate solid waste facilities. The section authorized grants totaling $314,580 to municipalities for equipment, planning, design, and construction of solid waste facilities, and engineering studies.
- The Solid Waste Unit's Technical Development and Training staff completed the conversion of operations of 6 disposal sites to the more efficient cell method of solid waste burial.
- The Solid Waste Unit's Enforcement Section conducted 575 inspections of public and private solid waste disposal areas, transfer stations, and volume reduction facilities.
- Eighty municipalities have submitted 20-year municipal solid waste management plans to the department, thirty of which have been approved.
- During the fiscal year, the Water Compliance Unit issued a total of 129 new orders and permits — 77 Abatement Orders and 52 National Pollution Discharge Elimination System (NPDES) permits. This brings the cumulative total of orders and permits issued since May 1967 to 2,528.
- During the year Water Compliance field staff conducted 214 reconnaissance inspections and 722 sampling inspections of major and minor permittees.
- As of May 1979 the department had entered into agreement for payment of $260,091,281 in grants for the building or improvement of sewerage treatment plants and storm and sanitary drainage separation projects. The total represents an increase of $3,843,627 over the cumulative total as of May 1978.
- The Water Quality Management Planning Section completed, in draft form, all nine Phase II river basin plans for Connecticut. These plans include detailed analyses of all designated water quality segments within the basins.
- A new Lakes Management office was formed to analyze and prioritize lake problems.
- During fiscal 1979 the Inland Wetlands Program of the Water Resources Unit received 72 applications for permits to conduct regulated activities. Forty-five permits were issued; 30 are pending.
- The Marine Wetlands Program received 180 applications for permits to conduct regulated activities within tidal wetlands and/or in the coastal, tidal, or navigable waters of the State.
- The Water Resources Unit has continued the development of flood management projects in cooperation with the U.S. Army Corps of Engineers, the U.S.D.A. Soil Conservation Service, and flood and erosion control boards of cities and towns throughout the State.
- During the year, 28 applications to place encroachments or obstructions riverward of established stream channel encroachment lines were received and authorized. ■

# Trailside Botanizing

by G. Winston Carter

## Tuliptree

### *Liriodendron tulipifers*

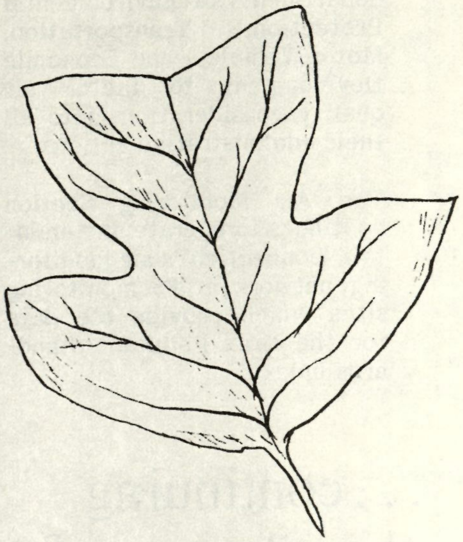
The Tuliptree is the largest member of the Magnolia family. It is a handsome tree, sometimes incorrectly called Tulip Poplar. Unfortunately, only a limited number of them grow in this area. They grow best in the Southern Appalachians where they may reach a height of up to 200 feet with a trunk which may be up to 10 feet in diameter.

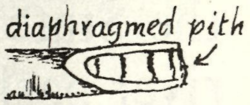
This tree shows its majestic qualities best when it has a chance to develop to maturity deep in a forest rather than along its edge. The lack of sunlight striking the lower half of the trunk produces a splendid tree with few lower branches and a well-developed crown.

Its bark is smooth in young specimens, but later it becomes furrowed with age. The leaves are an unusual shape, giving the impression that someone has cut off the ends with a pair of shears. In the fall they turn yellow. The twigs have continuous pith which is separated at intervals by diaphragms. This feature, along with its buds which resemble a duck's bill, will be helpful in winter identification.

In the early summer the blossoms of mature specimens are spectacular, with contrasting colors of orange and green. This gives way to a cone-like fruit, the seeds of which serve as food for deer, rabbits, squirrels, and song birds.

The wood is easily worked and has many uses, some of which are the lining of dresser drawers, cabinet work, and crates for packaging. Daniel Boone moved his family out of Kentucky and down the Ohio River to Spanish territory in a sixty-foot dugout canoe made from this wood.





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